

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-249973

(43)Date of publication of application : 26.09.1995

(51)Int.Cl.

H03K 19/003
H04B 1/40

(21)Application number : 06-042575

(71)Applicant : TOSHIBA CORP

(22)Date of filing : 14.03.1994

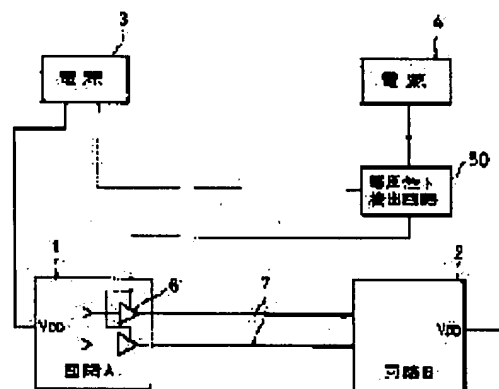
(72)Inventor : NAKAMURA AKIRA
TANAKA MASAYUKI

(54) ELECTRONIC EQUIPMENT

(57)Abstract:

PURPOSE: To obtain an electronic equipment capable of surely preventing the generation of a latch-up state in a signal receiving side circuit when a power supply for the circuit is turned off and executing stable control.

CONSTITUTION: When a voltage drop detecting circuit 5 detects the OFF of the power supply 4 for the signal receiving side circuit 2, an output from a signal transmitting side circuit 1 is turned to high impedance by a 3-state buffer 6 based upon the detection output of the circuit 5.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention possesses at least two circuits to which supply voltage is respectively supplied from the power source of another system, and relates to the electronic equipment improved so that the latch rise of the circuit of the signal receiving side at the time of turning off the power source of the circuit of a signal receiving side especially might be prevented about the electronic equipment which sends and receives a signal between these circuits.

[0002]

[Description of the Prior Art] Two or more circuits to which power is supplied from the power source of another system which became independent respectively are provided, and various things are known as electronic equipment constituted so that a signal might be sent and received between each circuit.

[0003] Drawing 5 is what showed the conventional example of such electronic equipment, and is set to drawing 5. Provide the circuit 1 (circuit A) of a transmitting side, and the circuit 2 (circuit B) of a receiving side, and from a power source 3, supply voltage is supplied and the circuit 1 of a transmitting side is driven. **** actuation of the supply voltage is supplied and carried out from a power source 4, and the circuit 2 of a receiving side is constituted so that a signal may be transmitted to the circuit 2 of a receiving side through a signal line 7 from the circuit 1 of a transmitting side.

[0004] By the way, even if the power source 4 of the circuit 2 of a receiving side is turned off, unless the power source 3 of the circuit 1 of a transmitting side is turned off in equipment conventionally which is shown in drawing 5, a signal is transmitted to the circuit 2 of a receiving side through a signal line 7 from the circuit 1 of a transmitting side. Consequently, in spite of having not applied supply voltage from a power source 4, with the signal transmitted from the circuit 1 of a transmitting side, the integrated circuit (IC) in the circuit 2 of a receiving side might carry out the latch rise, and, as a result, might be damaged.

[0005] In order to solve this problem, the two following approaches have been taken conventionally.

[0006] One of them is the approach of inserting resistance 13 in the signal line 7 which connects a circuit 1 and a circuit 2, as shown in drawing 6. Since the current of the electrical potential difference which the partial pressure of the electrical potential difference of the signal outputted to a circuit 2 from a circuit 1 is carried out by resistance 13 and the internal impedance of the input port of a circuit 2, consequently is built over the input port of IC in a circuit 2 which becomes low and flows in a circuit 2 from a circuit 1 also decreases according to this approach when only the power source 4 of a circuit 2 is turned off, it can prevent the IC in a circuit 2 carrying out a latch rise.

[0007] However, in this case, the input port of IC in a circuit 2 will be in an unstable condition, and will have the problem that control stabilized depending on this approach cannot be performed.

[0008] Another approach is an approach of forming the arithmetic and program control (CPU) 12 which controls compulsorily the signal outputted to it from the circuit 1 of a transmitting side in the circuit 1 of a transmitting side based on the detection output of this sag detector 5 while establishing the sag detector 5 which detects OFF of this power source by supervising the output voltage of this power source 4 in the power source 4 of the circuit 2 of a receiving side at OFF, as shown in drawing 7.

[0009] However, in the case of this approach, after the power source 4 of the circuit 2 of a receiving side is turned off, before turning OFF the signal outputted from the circuit 1 of a transmitting side by the software processing by CPU12, time amount will be taken, and a fear of IC in the circuit 2 of a receiving side carrying out a latch rise by this is still left behind.

[0010]

[Problem(s) to be Solved by the Invention] As mentioned above, in this conventional kind of equipment, when only the power source of the circuit of a receiving side was turned off, IC in the circuit of a receiving side carried out the latch rise with the electrical potential difference of the signal transmitted to the circuit of a receiving side from the circuit of a transmitting side, and there was a possibility of damaging.

[0011] Moreover, in order to prevent this, while forming a detection means in the circuit of approach 2 receiving side which inserts resistance in the signal line which connects the circuit of one transmitting side, and the circuit of a receiving side, OFF of the power source of the circuit of a receiving side Although how to prepare CPU which turns OFF the output of the circuit of a transmitting side compulsorily by software processing based on the detection output of this detection means in the circuit of a transmitting side etc. is considered Even if it can prevent IC in a circuit 2 carrying out a latch rise according to the approach of 1) There is a problem that the input port of IC in a circuit 2 will be in an unstable condition, and according to the approach of 2 By the time it turned OFF the signal outputted by software processing from the circuit of a transmitting side, time amount was taken, and there was a problem that IC in the circuit of a receiving side might carry out a latch rise by this.

[0012] Then, this invention aims at offering the electronic equipment which can perform stable control while it prevents certainly the latch rise in the circuit of a signal receiving side, when the power source of the circuit of a signal receiving side turns off.

[0013]

[Means for Solving the Problem] In the electronic equipment the invention in this application possesses at least two circuits to which supply voltage is respectively supplied from the power source of another system, and send and receive a signal between these circuits in order to attain the above-mentioned object A low-battery detection means to generate a detection output when the power source which the power source added to the circuit of the signal transmitting side of said circuits is ON, and is added to the circuit of the signal receiving side of said circuits becomes off is established. It is characterized by preparing the control means which makes high impedance the transmitting output of the circuit of said signal transmitting side based on the detection output of said low-battery detection means in the circuit of said signal transmitting side.

[0014]

[Function] According to this invention, as a low-battery detection means detects that the power source which the power source added to the circuit of a signal transmitting side is ON, and is added to the circuit of a signal receiving side became off, the transmitting output of the circuit of a signal transmitting side is controlled by the control means to high impedance based on this detection output and a signal does not flow in the circuit of a signal receiving side from the circuit of a signal transmitting side, protection of the circuit of a signal receiving side is aimed at.

[0015] Here, said control means is prepared in the output of the circuit of said signal transmitting side, and can possess and constitute 3 State buffer which makes high impedance the transmitting output of the circuit of said signal transmitting side based on the detection output of said low-battery detection means.

[0016]

[Example] Hereafter, one example of the electronic equipment in connection with this invention is explained to a detail with reference to an accompanying drawing.

[0017] Drawing 1 shows one example of the electronic equipment in connection with this invention with a block diagram. In addition, ** which gives the same sign as the sign of explanation used by drawing 5 for convenience to the part which achieves the conventionally same function as equipment shown in drawing 5 in drawing 1.

[0018] In the example shown in drawing 1, the circuit 1 (circuit A) of a transmitting side and the circuit 2 (circuit B) of a receiving side are provided, from a power source 3, supply voltage is supplied, the circuit 1 of a transmitting side is driven, and **** actuation of the supply voltage is supplied and carried out from a power source 4, and the circuit 2 of a receiving side is constituted so that a signal may be transmitted to the circuit 2 of a receiving side through a signal line 7 from the circuit 1 of a transmitting side. Moreover, the sag detector 50 is connected to a power source 4, and this sag detector 50 detects below an electrical potential difference predetermined in the supply voltage outputted from a power source 4, i.e., when a power source 4 is turned off, and generates a detection output in this case.

[0019] Here, although the sag detector 50 may be established in any by the side of the circuit 1 of a transmitting side, or the circuit 2 of a receiving side, it takes the power source of this sag detector 50

from the power source 3 of the circuit 1 of a transmitting side.

[0020] After all, the supply voltage to which a power source 3 is ON and the sag detector 50 is outputted from a power source 4 detects below a predetermined electrical potential difference, i.e., when a power source 4 is turned off, and a detection output is generated in this case.

[0021] Furthermore, in the circuit 1 of a transmitting side, 3 State buffer 6 which controls the signal output of the circuit 1 of a transmitting side to high impedance based on the detection output outputted from the sag detector 50 is formed.

[0022] If the power source 4 with which the power source 3 which supplies supply voltage to the circuit 1 of a transmitting side supplies supply voltage to the circuit 2 of ON and a receiving side according to such a configuration will be in the condition of calling it OFF, the output side of 3 State buffer 6 serves as high impedance, thereby, the current which flows in the circuit 2 of a receiving side from the circuit 1 of a transmitting side through a signal line 7 will be lost, and the latch rise of IC in the circuit 2 of a receiving side will be prevented certainly.

[0023] Drawing 2 shows other examples of this invention. It is not only transmitted to a circuit 2 from a circuit 1, but in the example shown in drawing 2, a signal applies this invention to the electronic equipment sent also to a circuit 1 from a circuit 2 through a signal line 10 through a signal line 7.

[0024] the configuration shown in drawing 1 in the example shown in this drawing 2 -- in addition, based on the detection output which forms further the sag detector 8 which detects below an electrical potential difference predetermined in the supply voltage outputted from a power source 3, i.e., when a power source 3 is turned off, and outputted from the sag detector 8 in a circuit 2, the signal output of a circuit 2 controls to high impedance -- it is prepared 3 State buffer 9.

[0025] In this case, the power source of the sag detector 8 is taken from the power source 4 of the circuit 2 of a transmitting side.

[0026] In such a configuration, the supply voltage to which a power source 3 is ON and the sag detector 50 is outputted from a power source 4 detects below a predetermined electrical potential difference, i.e., when a power source 4 is turned off, and a detection output is generated in this case.

[0027] Moreover, the supply voltage to which a power source 4 is ON and the sag detector 8 is outputted from a power source 3 detects below a predetermined electrical potential difference, i.e., when a power source 3 is turned off, and a detection output is generated in this case.

[0028] And if the power source 4 with which the power source 3 which supplies supply voltage to a circuit 1 supplies supply voltage to ON and a circuit 2 will be in the condition call it OFF when a detection output is generated from the sag detector 50 namely, the output side of 3 State buffer 6 serves as high impedance, thereby, the current which flows in a circuit 2 from a circuit 1 through a signal line 7 will be lost, and the latch rise of IC in a circuit 2 will be prevented certainly.

[0029] Moreover, if the power source 3 with which the power source 4 which supplies supply voltage to a circuit 2 supplies supply voltage to ON and a circuit 1 will be in the condition call it OFF when a detection output is generated from the sag detector 8 namely, the output side of 3 State buffer 9 serves as high impedance, thereby, the current which flows in a circuit 1 from a circuit 2 through a signal line 10 will be lost, and the latch rise of IC in a circuit 1 will be prevented certainly.

[0030] Drawing 3 shows the example of further others of this invention. A signal is not only transmitted to a circuit 2 from a circuit 1, but is sent to a circuit 1 from a circuit 2 through a signal line 10 through a signal line 7 like the example shown in drawing 2 also in this example.

[0031] In the example shown in this drawing 3, the sag detector 11 is established in the power source 3 which supplies supply voltage to a circuit 1, and a circuit 2 in common to the power source 4 which supplies supply voltage. In this case, either a power source 3 or the power source 4 enables it to take supply voltage, and the sag detector 11 will generate a detection output, if the supply voltage outputted from either a power source 3 or the power source 4 falls below to a predetermined electrical potential difference. The detection output outputted from this sag detector 11 is simultaneously applied to 3 State buffer 6 of a circuit 1, and 3 State buffer 9 of a circuit 2, and makes high impedance simultaneously the output side of 3 State buffer 6 and 3 State buffer 9.

[0032] According to such a configuration, as compared with the example shown in drawing 2,

simplification of a circuit can be attained substantially.

[0033] drawing 4 showed the example of a concrete circuit of the sag detector 11 shown in drawing 3 -- it comes out. The circuit shown in this drawing 4 possesses two diodes 20 and 21 and AND-gate circuits 22, and is constituted. In addition in the circuit shown in this drawing 4, the output voltage of a power source 3 and a power source 4 is further applied to the input of the AND-gate circuit 22 for the supply voltage outputted from a power source 3 and a power source 4 directly through diodes 20 and 21 as a power source of the AND-gate circuit 22, respectively. Here, if either of the supply voltage outputted from a power source 3 and a power source 4 falls below to a predetermined electrical potential difference, the output of the AND-gate circuit 22 will be controlled to be set to a low level and to become high impedance simultaneously with the output of this AND-gate circuit 22 in this case about the output side of 3 State buffer 6 and 3 State buffer 9.

[0034]

[Effect of the Invention] A low-battery detection means detects that the power source which according to this invention the power source added to the circuit of a signal transmitting side is ON, and is added to the circuit of a signal receiving side as explained above became off. Since it constituted so that the transmitting output of the circuit of a signal transmitting side might be controlled by the control means to high impedance based on this detection output Even when the power source of the circuit of a signal receiving side turns off, while preventing certainly the latch rise in the circuit of a signal receiving side, it becomes possible to perform stable control.

